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ABSTRACT

The presentation reviews the empirical data concerning the existence and types of language problems experienced by learning disabled (LD) and reading disabled (RD) children. An introductory section provides criteria for classification as LD in research samples and a discussion of research data sources in the field of language assessment. Section II focuses on investigations providing direct evidence of learning disabled children's nonverbal communication, phonology, syntax, semantics, verbal mediation, language in social contexts, scores on intelligence tests, and the relationship of scores on one test of language to one test of academic achievement. Section III considers indirect evidence of language problems provided by intelligence test and family studies. A final section reviews therapeutic and empirical implications of the research. Among conclusions is that in each language area the LD/RD child has significantly greater difficulty or less skills in each of the language areas measured. (SBH)

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COMMUNICATION PROBLEMS OF LEARNING DISABLED CHILDREN

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INTRODUCTION

"Children with special learning disabilities exhibit a disorder in one or more of the basic psychological processes involved in understanding or in using spoken or written language. These may be manifested in disorders of listening, thinking, talking, reading, writing, spelling, or arithmetic. They include conditions which have been referred to as perceptual handicaps, brain injury, minimal brain dysfunction, dyslexia, developmental aphasia, etc. They do not include learning problems which are due primarily to visual, hearing or motor handicaps, to mental retardation, emotional disturbance, or to environmental disadvantage" (Federal Register, 1976).

Learning disabilities are defined as a problem in which the child has some kind of difficulty which affects the ability to understand or use spoken or written language. In this presentation we shall review the empirical data concerning the existence and types of language problems experienced by learning disabled children. The presentation is titled "Communication Problems..." rather than "Language Problems..." because the discussion is not restricted to syntactic, phonological and semantic differences between learning disabled and nondisabled children. A broader perspective on language is adopted which includes nonverbal communication, the use of language in social contexts and problem solving.

Definition of Research Samples. The majority of research studies to be reviewed are based on samples of children defined on the basis of their reading achievement. It is a common practice among researchers interested in learning disabilities to select samples of disabled subjects from children who

have intelligence within the normal range but who are six months below grade level on reading achievement in the primary grades and 1-1/2 to two years below grade level in the elementary grades. This is justifiable on several grounds. First, it is consistent with federal guidelines for defining learning disabled children. According to these guidelines the child must exhibit a severe discrepancy between potential (i.e., intelligence) and achievement. But, there are neither operational definitions, standardized measures nor normative guidelines for most of the other terms in the definition of learning disabilities (e.g., thinking). Hence, reading achievement is the most salient skill in measuring academic success and the most easily quantified. Second, researchers designing studies must control for internal validity; they must ensure that experimental findings are due to what they are testing and not some other variables. For instance, if one is to study syntactic skills of learning disabled children, the results of any study must be related to syntax and not to group differences in intelligence. By limiting subjects to those with normal intelligence and deficit reading, researchers attempt to control internal validity. Third, there is evidence that the children being served in Child Service Demonstration Centers, federally funded programs to provide services to learning disabled children, are most likely to be receiving help for reading and language problems (Kirk and Elkins, 1975). For these reasons the assumption that children with learning disabilities are likely to have reading retardation seems quite reasonable.

There are serious drawbacks to developing a knowledge base of learning disabilities solely on reading disabled children. The use of reading scores to select samples is likely to eliminate from studies children who have been labeled and treated as learning disabled and may include children not labeled. This

results in a faulty impression that learning disabilities is a synonym for reading disabilities. In my research I have been selecting children labeled by the school as having learning disabilities, initially interested in testing the validity of various terms attributed to learning disabled children. In these studies subjects were all the children in the cooperating school districts who had been identified as learning disabled and who were receiving part time help from a learning disability specialist. In the course of these investigations learning disabled children were included who were scoring quite high, at the sixth stanine, on standardized reading tests. These children did not have reading problems, but they had been identified as learning disabled. In addition we have had many comparison, nondisabled children include children reading at the first, second and third stanines on standardized reading tests. These children were significantly retarded in reading achievement yet had not been included in special education programs. On the basis of our studies it appears that there are a variety of characteristics of children which trigger the assessment and treatment process. Whatever these characteristics it is clear that children's sex and race contribute to the determination of children as learning disabled. In addition it appears that characteristics of the school district also influence the labeling process. The socioeconomic status of the children, and the schools, as well as the assumptions and level of special education training of school personnel may affect the labeling process.

While it is no doubt trite to point out that learning disabilities represents a many splendored thing it is important to keep in mind that the research data on learning disabled children's language skills are based primarily on white middle class males who have reading problems. In terms of advancing our understanding of learning disabled children, research based on subgroups of

learning disabilities are needed. At this time, however, there is no taxonomy available for which there is empirical support. Specific to language problems, there is a paucity of descriptions of the language of learning disabled children.

LANGUAGE ASSESSMENT

Sources of Research Data. Lest one get the impression that there is a large corpus of information to review, let us disabuse ourselves of this notion. The field of learning disabilities is very young, it received federal recognition (hence, direct funding and legislation) barely ten years ago. Resources have been invested in efforts to establish service programs and train teachers. Sizeable amounts of federal funding for learning disabilities research just became available this year when the Bureau of Education for the Handicapped provided funds for five Institutes to research learning disabilities. The data to be reviewed are based on direct evidence from studies of language skills of learning disabled children and from indirect evidence based on intelligence test comparisons of learning disabled and nondisabled children and family interview data.

Studies of learning disabled children's language problems have employed naturalistic data derived from observations in school (eg., Bryan, in press), children's responses to standardized testing (eg., Wiig and Semel, 1976), experimental tasks devised to elicit particular responses from children (Shankweiler and Liberman, 1972) and ratings of children's language by parents (eg., Naidoo, 1972). Each method has its advantages and disadvantages. Observations in a naturalistic setting may be difficult to obtain (i.e. if the environment is noisy). It may be difficult to obtain accurate recordings. Observers are limited by the amount of information they can record. Using audio and video media, there

is the chance of reactivity, the children may act differently as a result of the presence of cameras and recorders. If one does not record the communication there is no way to obtain reliability of recordings unless one uses multiple observers. Multiple observers may lead to increased subject reactivity. In addition in the naturalistic setting one cannot control what happens. If a child fails to produce certain language forms it does not necessarily mean that the child does not have these in his repertoire, it may be that the situation did not necessitate the use of these forms.

There are serious limitations in the use of standardized tests. First, most of the standardized tests have norms limited to preschool aged children (Bloom and Lahey, 1978). In studying learning disabled children we have been primarily focused on school aged children. The standardized tests which have been used to assess older learning disabled children often have ceilings for children 8-10 years of age, (eg.) the Northwestern Syntax Screening Test, Lee (1970; 1971) the I.T.P.A., Kirk and McCarthy (1968). Or, the tests used, such as the Detroit Test of Learning Aptitudes (Baker and Leland, 1935) suffers from great limitations in methods of standardization, reliability and validity. These tests may be useful to compare samples of language deviant and normal children, but there is perhaps a more serious problem which indicates that generalizations about children's language simply using standardized tests provides a faulty view of their language capabilities. Prutting, Gallagher and Mulac (1975) compared children's performance on the Northwestern Syntax Screening Test to their performance during a relaxed informal situation. It was found that 30% of the linguistic forms which the children failed to use or used incorrectly on the NSST were correctly produced by children 50% of the time in their spontaneous communications. In another study, Dever (1972) compared the use of grammatical

morphemes by mentally retarded children in a structured setting and their spontaneous use in a nonstructured setting. Dever reported that the responses elicited from retarded children in a structured setting underestimated their use of morphemes.

According to Bloom and Lahey (1978) the WISC verbal IQ is the measure most frequently used to assess the language of school aged children. This provides a means of comparing learning disabled and nondisabled children, and has been used as such, but the information about a child's language system provided by this test is very limited in scope.

In terms of assessment the critical question may be the use for which the information is needed. If one wishes to compare children, or to establish that a child has a language problem, standardized tests which are norm referenced may be the most appropriate. Criterion referenced measures help to plan intervention and to evaluate the effects of an intervention program. For research purposes, at this time, descriptions of communications obtained in semi-structured situations in which the child is likely to feel relaxed, which obtains a sufficient sample of spontaneous communications, but which is likely to generate a wide variety of language forms would be the most heuristic.

DIRECT EVIDENCE: LANGUAGE AND COMMUNICATION SKILLS OF LEARNING DISABLED CHILDREN

Direct evidence of communication and language problems in learning disabled children are based on studies of nonverbal communication, studies of phonology, syntax and semantics, and studies of verbal communications in social contexts.

Nonverbal Communication. The studies of nonverbal communication were part of my research program these past several years. Research studies of the social relationships of learning disabled children led to the hypothesis that many

learning disabled children do have language based problems which affect their acquisition of social skills as well as academic skills. Striking in this series of studies is that while using hodge podge samples significant differences in nonverbal and verbal communication skills have been found between learning disabled and nondisabled children.

While studies of children's language development are typically restricted to their acquisition of phonological, syntactic and semantic systems, nonverbal communication has been included in our consideration of language development and use. Given the attentional, perceptual, behavioral attributes associated with learning disabilities it was hypothesized that such children might be at a particular disadvantage in learning nonverbal cues. The research is also influenced by studies of information processing. Information processing deficits, that is, deficits in comprehending and integrating auditory and visual stimuli, have been considered an explanation for learning disabilities. For example, the Illinois Test of Psycholinguistic Abilities has been used clinically and experimentally to determine auditory and visual information processing deficits in learning disabled children.

In this study we used auditory and visual nonverbal social stimuli to test learning disabled children's decoding skills. For this purpose a shortened version of a test was used which was developed by Professor Robert Rosenthal and colleagues (1977) to study nonverbal communication. In this test subjects are exposed to a film and an audiotape. The film has forty segments which display an adult female expressing positive or negative affect combined with dominant or submissive expressions. Examples include expressions of motherly love, gratitude, nagging, and asking for forgiveness. The forty audio scenarios present the same affects as the film, but the messages have been made uninterpretable by removal of the high frequency sounds or by scrambling and resplicing

the tape. The viewer is asked to indicate on a questionnaire which one of two statements best describes the scenario. To control for reading problems, the questionnaire items were read aloud to subjects immediately after the scenario.

The definition of learning disabilities in these studies, and the studies described later in the section on social communications, have been consistent. Subjects were children who had been identified by the school district as having a learning disability. These were children who have IQs above 80 on an individually administered intelligence test and discrepant academic achievement which warranted the daily, part time services of a learning disabilities resource room teacher. Most of the studies were conducted in a racially integrated suburban school district and included about 40% black children, and most of the studies included females. The children were in third, fourth and fifth grades. In each study there were control children randomly selected from classmates who matched the learning disabled children on sex and race.

The test of nonverbal communication was administered on two occasions. In both cases the results indicated that learning disabled children were significantly less accurate in comprehending nonverbal communications than nondisabled children. Modality of presentation did not affect the outcomes. Learning disabled children were less accurate than others on the audio and the visual presentations.

Wiig and Harris (1974) conducted a study of learning disabled children's ability to identify six emotions: anger, fear, embarrassment, frustration, joy and love. Compared to a nondisabled group, the 15 male and 2 female learning disabled children, were less accurate in judging these motions. Unlike the comparison group, learning disabled children confused emotions which are typically easily distinguished. For instance learning disabled children would confuse embarrassment with joy. Nondisabled children never made this error. However,

J. Bryan (in preparation) points out that the subjects indicated their choice of emotions by circling a word which best described the depicted emotion. Hence Wiig and Harris may have confounded their results with reading ability.

There is thus some evidence that on one component of language, decoding nonverbal communications, learning disabled children perform with less accuracy than their nondisabled counterparts. It is suggested that this is one specific component in the communication process which is contributing to some of the problems of learning disabled children. The negative attitudes of others toward learning disabled children may be a ripple effect of a process wherein learning disabled children fail to detect and decode adequately nonverbal cues from others, respond inappropriately, and thus elicit rejection. Children unable to detect, understand, remember and respond to others nonverbal cues are likely to be at a great disadvantage in social situations.

Given the evidence that learning disabled children are less accurate than nondisabled children in comprehending nonverbal cues, we ask whether they are also less accurate in encoding nonverbal cues? The question is raised as to whether these children are less skilled at expressing themselves through auditory and visual channels of nonverbal communication. While modulating several emotions, such as anger or joy, may be quite primitive, and acquired at early ages, the acquisition of subtle nonverbal behaviors appears gradually and certain nonverbal behaviors are not commonly used by children until they reach about ten to twelve years of age (Ziven, 1977).

There is no direct empirical evidence as yet that learning disabled children differ from others in their ability to encode nonverbal communication. There is indirect evidence suggestive that this may be the case. James Bryan and Barry Perlmuter (in preparation) had adults rate learning disabled and nondisabled

children. The adults viewed videotapes of the children playing a game with another child in a laboratory setting. Bryan and Perlmutter found that adults make very fine discriminations between learning disabled and nondisabled children. The learning disabled children are given lower ratings on clusters of items rating mental and physical presence and sociability (eg., "This child appeared well adjusted mentally and emotionally. This is not a very attractive child. This appears to be an intelligent child.") Learning disabled children were also rated as less dominant than nondisabled children (eg., "This is a timid child. This child is probably outspoken regarding what he or she thinks.") It is striking that on ratings of mental and emotional status, the distinctions are more clear for girls. Learning disabled females appear to be judged the most deficit of any group.

The findings of this study indicate that strangers who had no prior knowledge of the children's academic status nor any interaction with the child could, on the basis of exposure to 1-1/2 to 4 minutes of very poor videotapes, consistently and negatively judge learning disabled children. We believe, but have not yet established that a major contributor to adults' negative judgments of learning disabled children is their nonverbal behavior.

Phonological Evidence. The information processing hypothesis has been a major theoretical approach in studies of learning disabilities. But in the field of reading one school of thought is that deficits in processing phonological information is a cause of reading problems. Mattingly (1972) defines reading as a language based skill which requires the reader to know how shapes of letters and the combinations of letters relate to the sounds of language. Mattingly indicates that beginning readers and skilled readers encountering an unknown word form a phonetic representation of the written word. Vellutino (1977) suggests

that good and poor readers may be discriminated by differences in their conscious awareness of the fact that individual sounds make up words; that poor readers are less aware of the phonetic structures of words.

Clinically there has been recognition that deficiencies in the phonetic system are related to reading problems. For instance, Wepman's (1960) Auditory Discrimination Test which requires children to indicate if two words sound the same or different has been commonly used to test children's encoding of differences in sounds. In terms of decoding there has been evidence to suggest that children with reading problems are more likely than good readers to have speech articulation deficiencies (Naidoo, 1972). Children with difficulties articulating single sounds or difficulty hearing the differences in sounds are believed to have greater difficulty than others in segmenting words into individual units of sound; hence they are retarded in making phoneme-grapheme associations.

The idea that poor readers difficulties stem from deficiencies in segmenting words into single sounds is in direct contradiction to the idea that poor reading is the result of visual processing inefficiencies or from difficulties in comprehending chunks of text. Shankweiler and Liberman (1972) have conducted several research studies to sort out these opposing notions. For instance, they compared good and poor readers on oral reading of word lists versus repetitions of the same words and good and poor readers recognition of designs and faces in contrast to recognition of nonsense syllables.

The results of the Shankweiler and Liberman studies indicate that reading problems are not simply the result of auditory discrimination problems nor are they likely to be the result of visual perceptual problems. When children's ability to repeat words was contrasted with their ability to orally read the same words good and poor readers are better able to repeat words. In contrast

poor readers make many more errors than good readers in oral reading of these word lists. Poor readers thus show marked differences in their ability to repeat versus ability to read orally. This suggests that the oral reading errors are not a function of auditory discrimination problems. Second, an examination of the types of errors made on the oral reading suggests the problem is more phonological than visually perceptual. The largest proportions of children's errors were made on vowels (43%) and consonants (32%). Errors reflective of visual perceptual difficulties consisted of 10% on orientation errors and 15% sequence reversals. In addition children made more errors on the middle and final parts of the words than on initial sounds. Further support for the phonological explanation of reading difficulties is derived from a comparison of good and poor readers discriminations of faces, designs and nonsense syllables visually presented. Poor readers are not discriminated from good readers in ability to recognize designs and faces, yet they have considerably more difficulty with nonsense syllables. Finally, a follow up study indicated that kindergarteners who had difficulty segmenting words into single sounds were more likely than others to have difficulty in beginning reading (Liberman, Shankweiler, Liberman, Fowler, and Fischer, 1976).

In sum, the data supports the hypothesis that deficiencies in acquiring knowledge of the phonological system can have deleterious effects on the acquisition of reading skills. Vellutino (1977) hypothesized that the children may be having problems in making auditory discriminations among sounds, or, may not be aware of the component parts, segments, of words; hence are unable to make the necessary associations between spoken and printed language.

Studies of Syntax. There have been a number of research studies which examined the syntactic skills of learning disabled children. These studies are theoretically consistent with the research on phonological deficits in poor readers, by virtue of an underlying assumption that the acquisition of reading skills is directly related to language skills. Fry, Johnson and Muehl (1970) compared good and poor oral readers abilities to tell a story in response to twenty pictures. Good and poor readers were discriminated on the size of speaking vocabulary as good readers were found to have larger speaking vocabularies and to be more fluent. Second, poor readers were distinguished on the complexity of the linguistic patterns as they used more subordination in the subject position while above average readers used more subordination in the predicate position. Third, poor readers used more "existence" type sentences than above average readers. (An "existence" type sentence is one in which the sentence is introduced by the word "there" followed by a form of the verb "to be" as in "There's a dog"). In addition good readers were more likely to create meaningful stories while poor readers enumerated the content of the pictures.

Vogel (1977) developed a test battery to tape various kinds of syntactic skills in dyslexic and nondyslexic boys 7-4 to 8-5 years old. Dyslexic boys were different from the nondisabled in detecting whether a sentence heard was a statement of information or a question; hence they were less skilled in detecting differences in the rhythm of speech and its relation to the type of communication being expressed. The dyslexics were also less skilled in repeating sentences and in generating a word for one deleted from a spoken paragraph. In addition the dyslexic boys performed more poorly on a test of knowledge of morphological rules.

Wiig and Semel (1976) have studied syntactic skills in learning disabled children who ranged in age from about seven years through adolescence. In one

study they compared second through seventh graders language comprehension and production using the Northwestern Syntax Screening Test (Lee, 1974). On the comprehension part of this test the examiner makes a statement and the child has to indicate which of two pictures best fits the statement. On the expression part the examiner points to a picture and the child has to state what it represents. Not only were the learning disabled children inferior to nondisabled children but their performance placed more than half of the disabled below the tenth percentile in expressive language, a level suggested by Lee (1974) as indicating the child was in need of extensive intervention.

Wiig and Semel (1975b) provide evidence that syntactic deficits in learning disabled children persist into adolescence. When required to form a sentence using a stimulus word learning disabled adolescents generated more agrammatical and incomplete sentences than nondisabled peers. The agrammatical sentences were produced when the stimulus words were "after" and "belongs". In addition the learning disabled subjects sentences were marked by shorter mean word length and longer response times. Wiig and Semel describe the spoken language of learning disabled children as having a lack of specificity (defined by the use of many articles, uncommon nouns and adjectives and prepositions) and failure to exhibit a richness of vocabulary (defined by the use of uncommon verbs, adjectives and nouns and the use of indefinites). In addition their language was characterized as having an abundance of interjections, indefinite pronouns and conjunctions, absence of adjectives, and many filled pauses and word repetitions.

Using subjects defined as learning disabled and reading disabled, investigators have consistently found both classifications of children to be less skilled in decoding sentences, in generating syntactically correct responses to a variety of verbal and visual stimuli, in using complex types of grammatical

forms in sentences, in creating correct and/or imaginative sentences and stories from visual stimuli. The data are sparse but their consistency in finding disabled subjects less adequate than nondisabled on so many variants of syntactic behaviors suggests this is a fruitful avenue to pursue.

Semantic Research. There is not a great deal of empirical evidence concerning learning disabled children's acquisition of semantic skills, and often the research studies are the same as the ones cited for syntax research. As with the syntax research the results, albeit sparse, support the notion that learning disabled children are at a disadvantage in comparison to nondisabled children in the acquisition of semantic skills.

Fry, Johnson and Muehl (1970) interpreted the differences between good and poor readers on the oral story telling exercise to be the result of linguistic deficiencies. This means the child with limited word recognition and comprehension ultimately has limited numbers and types of verbal labels available for learning. The linguistic deficiencies in turn make it more difficult for the child to make associations between sounds and symbols and to obtain meaning from context.

Do learning disabled children have difficulty in attaching verbal labels to stimuli? Denckla (1974) compared word naming in dyslexic, nondyslexic minimal brain damaged and normal eight to ten year olds. The results were that dyslexic children made more errors in naming pictured objects than normals and dyslexics were discriminated from nondyslexics in naming words which appear infrequently. Contrasting dyslexic with nondyslexic minimal brain dysfunction children it was found that dyslexics were more likely to use circumlocutions (41% of total errors), the MBDs to use wrong names (61% of total errors). Dyslexic subjects also had longer response latencies than the other groups.

Denckla and Rudel (1976a, 1976b) compared good and poor seven to twelve year old readers on rapid naming tasks. As in the other studies, the poor readers not only make more errors but they take longer than good readers to generate the names of common objects, numerals, colors, words and letters. In the same vein Perfetti and Hogaboam (1975) also found poor readers have a longer response latency on rapid naming of words, pseudowords, and words with more than one meaning.

Differences in correct naming and differences in speed of response between dyslexic and nondyslexic children appears to continue to discriminate these children into adolescence. Wiig and Semel (1975b) had learning disabled adolescents retrieve labels for pictures of objects, letters geometric forms, actions, numbers and colors. The learning disabled subjects committed more naming errors and took longer to respond. In addition Wiig and Semel (1975b) found that learning disabled adolescents were less able to provide definitions for words (eg., robin, apple, return, different, bridge, continue, history, material, decide, and opinion). For example, while 22 of 32 learning disabled subjects were unable to define the more abstract terms (eg., bridge, history, material, decide and opinion) only two of the 32 nondisabled adolescents failed to make correct sentences with these items.

Automaticity. The consistent finding that learning disabled and reading disabled children have a longer response latency when required to make a verbal response raises the question of whether they are having difficulty in developing automaticity. "Automatic processes" refer to processes which we accomplish without awareness, intention or much effort (Posner and Snyder, 1976). Processing efficiency refers to the speed with which verbal information is learned and the ease of subsequent recall. Longer response latency to recall verbal labels thus

suggests that learning disabled children are not as proficient at automatic processes. But recent study in which one component of automatic processing was measured failed to find learning disabled children to be less efficient than nondisabled children. Goldstein, Koster, Hasher and Edelman (1978) presented groups of learning disabled and nondisabled children with lists of words. Following exposure to these words subjects were presented with lists which contained these words and others. They had to indicate which words they had seen on the earlier trials. The learning disabled children were not distinguished from nondisabled children in estimating which words had been presented earlier although they tended to overestimate the number of times they had seen stimuli words. This study suggests that learning disabled children were not less skilled in the automatic processing of information. However there is a critical difference between the response demanded in the automaticity study and the studies of verbal skills. In the automaticity study subjects had to recognize words, in the verbal studies subjects had to produce verbal responses, ones which were often quite specific. Less efficient automatic processing in learning disabled children may then be specific to difficulty in retrieving stored verbal information and greater difficulty in manipulating symbols. A research area which has investigated the use of verbal symbols to solve problems is that of verbal mediation. The use of verbal labels and rehearsal during learning tasks may then provide some evidence as to whether learning disabilities are related to inefficient processing of verbal information.

Verbal Mediation. Mediation is a process that takes place in a person after the person sees or hears something and before he makes a response. One important form of mediation is language, and the child's use of language in

problem solving activities is considered critical for the child's development (Bryan and Bryan, 1978). The question is then raised as to whether the differences in verbal skills and the longer response latencies in learning disabled children are related to their inability to use language in problem solving tasks which are facilitated by mediation. Vellutino and colleagues (1977) have systematically been studying whether poor readers suffer from a deficit in visual perception, a popular interpretation of reading failure. The results of their research have consistently found that reading disabled children were not different from good readers on tasks which require only visual perception but that their performances deteriorates when verbal symbolization is required in the task. The results of this programatic research led Vellutino to conclude:

"...poor readers lack the implicit linguistic cues (syntactic, semantic, and phonologic) that alert them to the critical differences in letters and words. Consequently, they take longer and have more difficulty in stabilizing positional and directional constancy in reading and spelling. Poor readers, therefore, are typically slow and plodding in processing written material; such perceptual inefficiency, however, would seem to be a consequence of dysfunction in visual-verbal learning rather than an indication of visual-perceptual deficit in the strict sense." (1977, p. 346).

There is some direct evidence that reading disabled children are less efficient in problem solving due to verbal mediation deficits. Torgesen and Goldman (1977) administered two memory tasks to second grade children who were significantly different on reading scores. On the first memory task, children were shown seven line drawings of common objects. After an exposure of one picture per 2 seconds the child lowered translucent goggles over his eyes for a 15 second delay period. Then the child had to point to the pictures in the sequence the experimenter had pointed to them. Children's performance was evaluated on the number of stimuli recalled in the correct sequence and on the

evidence that the child verbalized; that is, rehearsed during the 15 second delay period. The child's use of rehearsal was judged by the experimenter on the basis of whether the child spoke the stimulus names or used lip movements that indicated to the experimenter that the child was rehearsing, or by random lip or facial expressions. In addition, children were asked if they had done anything to help remember the sequence. The results indicated that the higher scoring readers performed significantly better on total recall of the sequence and on the amount of verbalization. The results were that the good readers performed significantly better on total recall, and on the amount of rehearsal. They were also much more likely to indicate an awareness of having used a rehearsal strategy.

Immediately following the first task the memory task was repeated. In this instance, however, the child was required to say aloud the picture names during the presentation and recall phases. It was hypothesized that this procedure may serve as an inducement to children to rehearse. It was found that the reading-disabled group improved significantly between the first and second tasks on verbalizations and total recall. But good readers did not demonstrate significant improvement across tasks. In addition, the scores on recall and verbalizations did not discriminate between good and poor readers on the second task. The results thus provide support for the notion that reading disabled children do not spontaneously employ verbal rehearsal on problem solving tasks, and, that external inducement to rehearse can erase their failure to do so.

LANGUAGE IN SOCIAL CONTEXTS

Given the importance of language in social discourse it is surprising that there is little information available on how the various linguistic deficits found in learning disabled children might affect their relationships with other people. Being less accurate in comprehending nonverbal communication, slower to respond with verbal labels, the use of less specificity and less complexity in communications could all reasonably negatively affect learning disabled children's ability to interact with others. Entwisle (1975) adds to this discussion by pointing out that children have to not only acquire basic language forms, but they have to learn how to use various language styles; that is, they have to know what to say to whom and when to say it. For instance, depending on one's audience, we modulate the pitch and loudness of our voice, syntactic complexity and vocabulary, as well as content. When a child fails to modulate his verbal and nonverbal communications as expected, it is a reasonable prediction that parents and teachers, and possibly peers, will become irritated and rejecting of the child. The child with difficulty understanding others and expressing himself may have difficulties eliciting positive affect and positive responses from others.

Based on several studies in which it was found that learning disabled children received more sociometric votes of rejection and fewer sociometric votes of acceptance (Bryan, 1974a, 1976). Bryan hypothesized that learning disabled children are experiencing social rejection because of inadequate communication skills. Laboratory and observational studies were conducted to compare both the semantic content and the linguistic complexity of learning disabled and nondisabled children's communications. The linguistic analysis was part of a laboratory study based on Shatz and Gelman's (1973) finding that

four year old children communicated differentially to adults, peers and two year old children. Four year old children use shorter utterances and more attention getting statements when speaking to two year olds than when speaking to adults and peers. Bryan and Pflaum (1978) employed forty fourth and fifth grade learning disabled and nondisabled males and females in a laboratory setting in which each child taught a laboratory game to a same aged classmate and a kindergarten aged child. The children's communications were videotaped and then analyzed for their linguistic and social content. The linguistic analysis was based on the Children's t-units. A t-unit is defined as an independent clause with all the dependent clauses attached to it. A t-unit has a subject and one or more predicates. Within a t-unit there may be several linguistic structures which increase its complexity. These include dependent adjective and because clauses, adverbial, nominal and if clauses and the use of modifiers. Not all utterances are t-units. There are incomplete phrases, mazes and tangles (eg., "So wait it t'l you see that...") and isolated words, often used in introductory phrases (eg., "oops, yeah"). Children's communications were classified according to: the total number of t-units, modifiers, non t-unit phrases and words, the mean length of t-units and the proportions of t-units which were complexities.

The results of the t-unit analysis of children's communications in the laboratory game situation were main effects for three of the linguistic categories, those which tap linguistic complexity rather than verbal talkativeness. Learning disabled children used shorter mean-t-unit lengths, smaller proportions of their t-units were complexities, and they used fewer modifiers. However, group interactions indicated that only male learning disabled children differed in linguistic complexity. Learning disabled females did not manifest the same pattern. These data indicate that in a social context, learning disabled males use less complex linguistic structures.

The communications were analyzed for their content as well. The children's communications were categorized as Instructions (how to play the game), Positive Social (personal and task related conversation, laughter and humor), Neutral Feedback (keeping score), Incompetence (failure to clarify or to give misinformation, inappropriate humor), Competitive/Negative ("I beat you") and Negative ("That's terrible"). The results were that, in general, subjects made adjustments in the content of their communications to younger and same aged peers. Younger children received more feedback and repetitions but less competitive and incompetent communication than peers. There were significant differences between learning disabled and comparison children on the categories Instructions and Incompetence. Learning disabled children provided about the same amount of instructions to peers and younger children. But nondisabled children provided a much higher proportion of instructions to younger children than to peers. On the incompetent category learning disabled children engage in a higher proportion of these communications than nondisabled children. But the groups most likely to engage in incompetent communications were white learning disabled males (when interacting with peers) and white learning disabled females (when interacting with younger children). Black learning disabled children and white and black nondisabled children engage in much smaller proportion of incompetent communications.

The results of this study supported the hypothesis that learning disabled children's communication in a social context would be discriminated from nondisabled children. By examining differential communications to younger and same aged children it was found that learning disabled children use less complex language than nondisabled children and fail to use less complex linguistic forms and differential content when communicating to younger children. The results

appear to be particularly relevant for learning disabled males, and, for Incompetence, to learning disabled white males.

Differences in communication content were also found in two classroom observational studies (Bryan, Wheeler, Felcan and Henek, 1976; Bryan, 1974; Bryan and Bryan, 1978b). Children's conversations in the classroom were recorded verbatim in both studies by having one experimenter record everything a subject said and a second experimenter recorded everything someone else said to the subject. In the first study two types of communication categories, Competitive and Consideration, were found to discriminate learning disabled and nondisabled children. Learning disabled children emitted more competitive statements than nondisabled children. Competitive statements were those which indicated the child was comparing his performance with that of another child. Nondisabled children emitted more Consideration statements than disabled children. Consideration statements were "nice guyisms" such as letting a peer go first, reminding the other child of his/her turn (in physical education class) and giving positive reinforcements to others. The Consideration category was considered quite important because it is comprised of statements made with no direct or obvious antecedent; these are gratuitous forms of niceness generated spontaneously with no readily detectable overt cue. It is believed that this type of communication is used to establish a link with another person, to communicate positive feelings toward and elicit positive feelings from that person. In children's relationships this type of communication might be quite important in establishing and maintaining friendships. Failure to emit such statements, in conjunction with the emission of more competitive communications, may be responsible for the sociometric rejection of learning disabled children.

In the second observational study of children's communications the communication categories consisted of Rejection (competitive, very nasty, mildly nasty statements and Rejection Total), Requests for Information and Materials, Helping/Cooperation/Giving Materials; Positive Reinforcement/Social Consideration; and Egocentric statements. The comparison of communications of twenty-five learning disabled males and females and twenty-five nondisabled males and females found learning disabled children more likely to emit very nasty statements to peers and to be the recipients of more very nasty statements than peers. Learning disabled children tended to be more likely to fail to respond to others than nondisabled children and to engage in more Rejection Total statements than peers. The sex of subjects played a role in the communications received from peers. Learning disabled males were the most likely to have peers fail to respond to them while learning disabled females were the least likely to not be responded to. But learning disabled females were the recipients of the greatest amount of peer mildly nasty statements followed by nondisabled males, learning disabled males and nondisabled females.

As in the linguistic analysis of social communications there are differential effects for learning disabled males and females. While the interactions effects of learning disabilities and sex are complex, it is clear that learning disabled children speak in less complex ways linguistically and less desirable ways communicatively. The learning disabled speak in a nastier manner and are more likely to ignore the interpersonal initiations from peers.

In light of the linguistic and content differences in learning disabled and nondisabled children's communications in social contexts it is suggested that learning what to say, when and to whom and how may represent significant deficit areas for many learning disabled children. The results of these studies indicate

that learning disabled children are experiencing very real difficulties in establishing satisfactory social relationships with others and that these problems are related to language skills. The sources of difficulty for learning disabled children has been related to difficulties in comprehending nonverbal communication, and the form and substance of their expressive language-what they say and how they say it.

Academic Achievement. The unspoken assumption in all of the research reviewed is that deficit language is related to poor academic achievement. Using retarded reading scores to select subjects, these several studies have found that poor readers do indeed manifest a wide variety of language problems. In this study Magee and Newcomer (1978) examined the relationship between children's performance on a language test and an academic achievement test. The Test of Language Development (TOLD, Newcomer and Hammill, 1977) and the Peabody Individual Achievement Test (PIAT, Dunn and Markwardt, 1970) were administered to 38 6-7 to 8-11 year old learning disabled children. TOLD is a newly developed test which consists of five subtests to measure phonological skills. Semantic subtests include Oral Vocabulary and Picture Vocabulary. Syntax is assessed through tests of sentence imitation, grammatic understanding (child must select one of three pictures which best matches a spoken sentence), Grammatic Completion (child has to complete a sentence). The phonology tests include articulation and word discrimination tests (child has to discriminate between speech sounds). The subtests of the PIAT include Mathematics, Reading Recognition, Reading Comprehension, Spelling, and General Information. A correlational analysis indicated that several oral language skills are related to scores on the PIAT. Oral vocabulary (defining words), Grammatic Completion (completing sentences) and Grammatic Understanding (understanding spoken sentences which use different

grammatical forms) were related to PIAT scores. For instance, Reading Comprehension has a positive correlation of .38 with oral vocabulary, .43 with Grammatical Understanding and .54 with Grammatical Completion. The PIAT subject General Information shared the highest correlations with language subtest, as there was a correlation of .55 with Oral Vocabulary and .50 with Grammatical Understanding.

While correlational data do not establish cause and effect relationships, and one study does not a science make (especially a study with no nondisabled comparison group), this study does provide evidence that syntactic and semantic deficiencies may be directly related to academic skill performance.

In summary the evidence repeatedly indicates that learning disabled children show pervasive and enduring language problems across a wide variety of language tasks. The studies have suggested that the problems experienced by learning and reading disabled children may fall into the categories of phonology, syntax and semantics, as well as nonverbal communication. In terms of nonverbal communication they are less accurate in interpreting nonverbal auditory and visual cues. In phonology it appears that they are less skilled in detecting the segments of single words and thus have difficulty establishing phoneme to grapheme correspondence. In the area of syntax learning disabled males are less skilled in dealing with inflection and the comprehension and creation of complex sentences. In semantics they are less adequate than nondisabled children in defining words, creating sentences, classing objects into categories, showing less adequate sentence production, are less skilled at recognizing their errors (Bryan and Bryan, 1978) and are significantly slower in generating verbal responses. Finally there is one study to suggest that syntactic and semantic skills are related to academic achievement.

INDIRECT EVIDENCE: INTELLIGENCE TESTS AND FAMILY STUDIES

Intelligence Test Quotients. While continuous and fairly considerable debate as to the value of intelligence tests has led to a decrease across the country in the use of these tests, the individually administered intelligence test is part and parcel of the psychoeducational evaluation of a child referred for school problems. Whatever one's interpretation of the meaning and utility of intelligence tests the results of individually administered scales have been found to be predictive of school performance. The position is taken that the intelligence test quotient is useful to make predictions about the likelihood of a child's success in a school program which emphasizes verbal skills and abstract ideas. With this in mind the question is raised as to whether learning or reading disabled children have lower intelligence quotients from academically successful children. Insofar as the definition of learning disabilities specifies intelligence within the normal range, intellectual deficits should not be found among learning disabled children. But insofar as learning and reading disabilities may have language based problems and language related skills are heavily tapped by IQ tests, it would be expected that these children would have lower intelligence quotients than comparable peers. Using the Wechsler Intelligence Scale for Children (WISC) with its verbal scale and performance scale, Rabinovitch (1959, 1968) suggested that poor readers differed from good readers on measures of "verbal intelligence" but not on "nonverbal intelligence."

There have been a number of studies in which learning disabled children were found to have lower IQs than comparison children. Birch and Belmont (1964) studied WISC patterns in retarded and normal readers. It was found that the retarded readers had lower IQs than normal readers. Even when the lower level

group, those with IQs between 80-89 were removed for analysis, the reading retarded group still had lower IQs than the control group.

Other researchers (Schwartz and Bryan, 1971) restricted the intelligence range from 85 to 115; nonetheless the learning disabled children still had significantly lower intelligence quotients than a comparison group. In another study (Dykman, et al., 1971) group differences were maintained when intelligence was carefully controlled while in another study (Browning, 1967), group differences disappeared when intelligence was held constant. These results raise the spectre that a sizable number of children labeled learning disabled could or should have been diagnosed as mentally retarded. But the findings of a series of studies in which intelligence was carefully controlled indicated that there were group differences on tasks which required verbal processing of information but not on tasks which required visual processing of information (Vellutino, 1977); findings which support Rabinovitch's earlier hypothesis that learning problems reflect a deficit in "verbal intelligence." Huelsman (1970) studied the discrepancy between the Verbal and Performance scale scores on the WISC by reading disabled and good readers. These results also support Rabinovitch's hypothesis as 61% of the poor readers had higher Performance than Verbal scores in contrast to 38% of the good readers. Please note that if the discrepancy scores were used as a basis of diagnosis 39% of the underachievers and 38% of the achievers would be misdiagnosed (Bryan and Bryan, 1978).

Family Studies. In an effort to determine if there is a constitutional basis for dyslexia an extensive study was made of two groups of boys; one with severe reading retardation, the other with spelling difficulties (Naidoo, 1972). In this study there were 98 dyslexic boys, ages 8 to 12, plus separate control groups for the reading retarded and the spelling group. The study involved

parent interviews, school records and school estimates of parental interest, psychological and medical evaluations. The results found no significant factors related to the family. Socioeconomic class, mothers' ages, fathers' ages, birth order, ordinal position in the family, the number of mothers who had worked did not discriminate dyslexics from nondyslexics. In addition the dyslexic children had not been absent from school for longer periods during their first years in school. Parent interviews did reveal the following. There was a higher incidence of reading difficulty among the dyslexic group's families than among the families of the controls. Among dyslexics, 36.7% of the families had positive family histories in comparison to 11.5% of the comparison groups. Parents also indicated that the dyslexics said first words later than nondyslexic boys. The age at which the boys began to use sentences discriminated groups. The mean age for sentence use was 27.8 months for reading retardates, 20.6 for their controls; 26.5 months for spelling retardates and 21.2 months for their controls. More than 1/3rd of the reading retarded and one-fourth of the spelling retarded were not using sentences until they reached 30 months or later. This occurred in less than 1/10th of the control group. In addition, the speech articulation discriminated groups as early articulation problems were reported much more frequently by parents of the reading and spelling deficit children. The reading retarded also walked unaided later than the comparison children and were described as clumsier more frequently.

School teachers were asked to rate the parents and the teachers. Parents of all the children were seen as concerned about their children, and only dyslexics parents were viewed as over-anxious. While boys with evidence of social adjustment problems had been eliminated from this study, teachers rated the reading retarded as more likely to have adjustment problems (30.4% of the reading retarded; 12.5% of their controls; 21.4% of the spelling retardates and 23.8% of their controls).

On the psychological evaluation WISC scores revealed that the reading retarded group scored significantly lower than their comparison group while the spelling retarded group was similar to their control group. Neale's Analysis of Reading Ability, Schonell Graded Word Reading Test and Schonell Spelling Test were used to test reading. The reading retarded group scored at least two years below their chronological age, the spelling group scored five to fourteen months below their chronological age and the control groups scored far ahead of their chronological age. Because the comparison groups performed in advance of their ages, the reading problems of the dyslexic groups appear to be even greater than their retarded scores would suggest. The gap between their performance and the achievement of their peers is great indeed.

Clinical assessments of articulation were made using the Renfre Test of Articulation Attainment. There were significant differences between both the reading and spelling groups and their controls. Articulation was found to be defective in 17 reading retardates, 8 spelling retardates, 4 and 3 in each control group. This means that about 28% of the dyslexics had articulation deficiencies, in spite of the 8 to 12 age range in this study. In addition children were administered a test of sound blending. The examiner articulated 20 familiar words which had 2, 3, 4 or 5 letters. The child had to say what the word was. About 2/3rd of the reading retardates could not blend words that had more than 3 or 4 sounds. The control children could blend words with 4 to 5 sounds by age 8 years; the dyslexics were unable to do this before age 11 years.

The neurological assessment indicated that the dyslexics were more likely to have poor voluntary motor control and a greater frequency of atypical laterality patterns. There was no evidence that the dyslexia was the result of pre or perinatal trauma, although there were a few cases in which the disorder might have been acquired through some birth related factors.

To determine if the dyslexics could be subgrouped a cluster analysis of the various measures was computed. There were no clear clusters to indicate subgroups of problems. Common to the reading and spelling retarded groups were difficulties in reading and spelling, difficulties blending sequences of sounds into words and lower scores on the WISC subtests of digit span and coding.

In another study, Owen, Adams, Forrest, Stolz and Fisher (1971) studied parents and siblings of learning disabled and nondisabled children. They found that the learning disabled had less adequate verbal skills. The learning disabled were subdivided into five groups, those who had a history of organic or physical abnormality, those who had high WISC performance scores relative to their verbal scores, those who had relatively low IQ scores, those who had relatively high IQ scores and those who demonstrated some emotional difficulties. Children within the first three categories are those who have language related problems. Children in the relatively low IQ group had IQs between 90 to 99 on the WISC. These children had problems of articulation as well as receptive and expressive language problems. These children were described as having difficulty listening in school, difficult to talk to, and as having a history of limited sound production. Neither their siblings nor parents exhibited these problems.

Children who had a history of organic or physical difficulties had receptive and expressive language problems and difficulty reproducing auditory stimuli. Children in the group with high IQ performance scores relative to verbal scores (15 point difference or higher) had problems in articulation, marked by distortion, substitutions and omissions of sounds. These children seemed to have difficulties in sequentializing auditory stimuli. And the siblings and mothers of these children also evidenced language problems.

The remaining two groups did not have language problems.

The results of the Naidoo (1972) and Owen, et al. (1971) provide further evidence that language problems are pervasive in learning disabled children. Developmental delays and continuing difficulties in blending and articulating sounds support the experimental data on the existence of language problems in learning disabled children. The researchers' attempts to subgroup types of learning and reading disabled children is laudable. But our readiness to build a taxonomy of learning/reading/language problems remains in a primitive state.

SUMMARY

In this paper we have reviewed the research data on language and communication problems of learning disabled and reading disabled children. First we see that there are limitations to the samples used in these studies as they appear to be primarily white middle class males with reading problems. Second the evidence is based primarily on data obtained from standardized tests, although there is some derived from naturalistic observation, experimental structured elicitations, and family interviews. The investigations have examined learning disabled children's nonverbal communication, phonology, syntax, semantics, verbal mediation, language in social contexts, scores on intelligence tests, and the relationship of scores on one test of language to one test of academic achievement. In several research areas knowledge is based on one research study. There are limitations in reviewing this area by virtue of the methods of identifying samples, the methods of study used, and the paucity of data in any one language area. Nevertheless, when the results of these studies are reviewed the findings are quite consistent. In each language area the learning disabled/reading disabled child has significantly greater difficulty or less skills in each of the language areas measured. In nonverbal communication learning disabled children

are less accurate in comprehending the auditory and visual nonverbal cues of a social message. In phonetics, reading disabled children appear not to have a sense of the segments of words; hence it is reasoned that their reading is negatively affected. A variety of measures of syntax and semantics find that learning disabled children are less competent than nondisabled children, and, that this difference persists into adolescence.

What are the implications of these research findings? There are therapeutic and empirical issues raised by these investigations. First to find that a significant number of learning disabled children and adolescents are likely to be experiencing language deficiencies in relation to nondisabled peers raises several questions concerning identification and intervention. First, is the language of learning disabled children typically assessed in psychoeducational evaluations? If the child is seen by a psychologist he is likely to be administered an individual intelligence test, most likely a WISC if the child is more than six years old. If the child then has a low score on the verbal scale this is likely to be interpreted as an indication of his intelligence level rather than used to analyze his language. If the child is evaluated by a learning disability specialist, he is likely to be administered an I.T.P.A. While this is supposed to be a test of psycholinguistic skills it does not test the child's language skills in such a way as to allow planning a language oriented intervention. The subtest of grammatic closure is the only assessment of language skills as linguists would define language. The I.T.P.A. tests auditory and visual memory, the child's association of visual to verbal stimuli; it does not test form, content, and use the categories defined by Bloom and Lahey (1978). It is only if the child is referred to a speech therapist that he is likely to have his language assessed, and even then it is possible

that standardized tests, (eg., such as tests of articulation) may be employed. In other words a child's language has to be quite deficient and obviously so for the child to receive help on language related skills. Furthermore, even if the language problem is detected, it is unknown as to what type of services are being received nor their rate of success.

Another problem bridges the gap between therapeutics and research issues. This is the question of the relationship of language skills to reading proficiency. How much of what kind of language does one need to be academically successful? We really do not know how language skills relate to the various academic and nonacademic activities in the classroom. At this point it is a "rain in Spain" argument, as it is hypothetical that language problems of learning disabled children are the cause or a correlate of their academic achievement problems.

All of this leads to the necessity for systematic research on the language skills of learning disabled children, and the relationship of language skills to other learning. But the research that is needed should be cast in current linguistic methodology, taxonomies and theories. It is only in the recent past that Chomsky's work on generative transformational grammar began to influence research on deviant language (Lahey, 1978). Menyuk's (1964) study was the first to use Chomsky's ideas to compare sentence use in children with deviant and normal language. Since then there have been several studies of children with deviant language in which current linguistic theory has been applied (Lahey, 1978). The time is ripe to apply linguistic theory to study the problems of learning and reading disabled children.

COMMUNICATION PROBLEMS OF LEARNING DISABLED CHILDREN

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- I. Introduction
 - A. Definition of Research Samples
 - B. Sources of Research Data: Language Assessment
- II. Direct Evidence: Language and Communication Skills of Learning Disabled Children.
 - A. Nonverbal Communication
 - B. Phonological Evidence
 - C. Studies of Syntax
 - D. Studies of Semantics
 - E. Automaticity
 - F. Verbal Mediation
 - G. Language in Social Contexts
 - H. Academic Achievement
- III. Indirect Evidence: Intelligence Test and Family Studies
 - A. Intelligence Test Quotients
 - B. Family Studies
- II. Summary
 - A. Implications: Therapeutic
 - B. Implications: Empirical

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